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(54) **SECURITY SYSTEM FOR A MOTOR VEHICLE OPENING LEAF COMPRISING A PROTECTIVE COVER**

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(52) **U.S. Cl.** **340/426**; 340/555; 362/501; 296/146.7
(58) **Field of Search** 340/426, 555, 340/556, 545.6, 545.7, 565, 542; 296/146.5, 146.6, 151, 146.7; 307/10.1, 10.2, 117; 362/501; 200/61.02, 61.85

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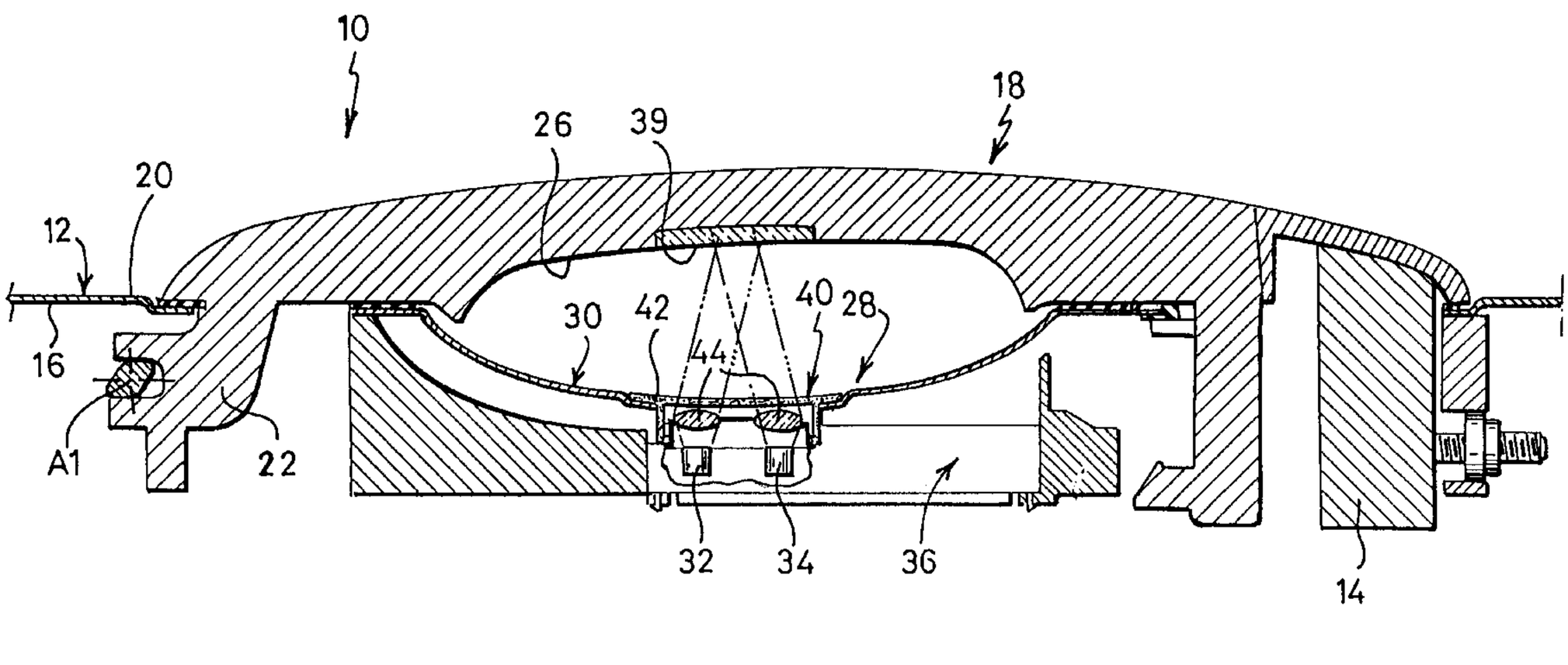
(57) **ABSTRACT**

The invention relates to a security system for a motor vehicle opening leaf comprising means for detecting, remotely, the presence of a user's hand near the handle of the opening leaf, the detection means comprising at least one sensor **(32, 34)** capable of emitting or of receiving an electromagnetic signal,

borne by an internal module **(36)** which bears the sensor **(32, 34)** in such a way that the sensor **(32, 34)** is opposite an opening made in the bodywork panel **(12)**.

The security system further comprises a cover. The opening in the bodywork panel **(12)** is blanked off by a cover **(40)** made of a material that is transparent to the electromagnetic signal, the cover **(40)** being secured against an external face of the bodywork panel.

20 Claims, 2 Drawing Sheets



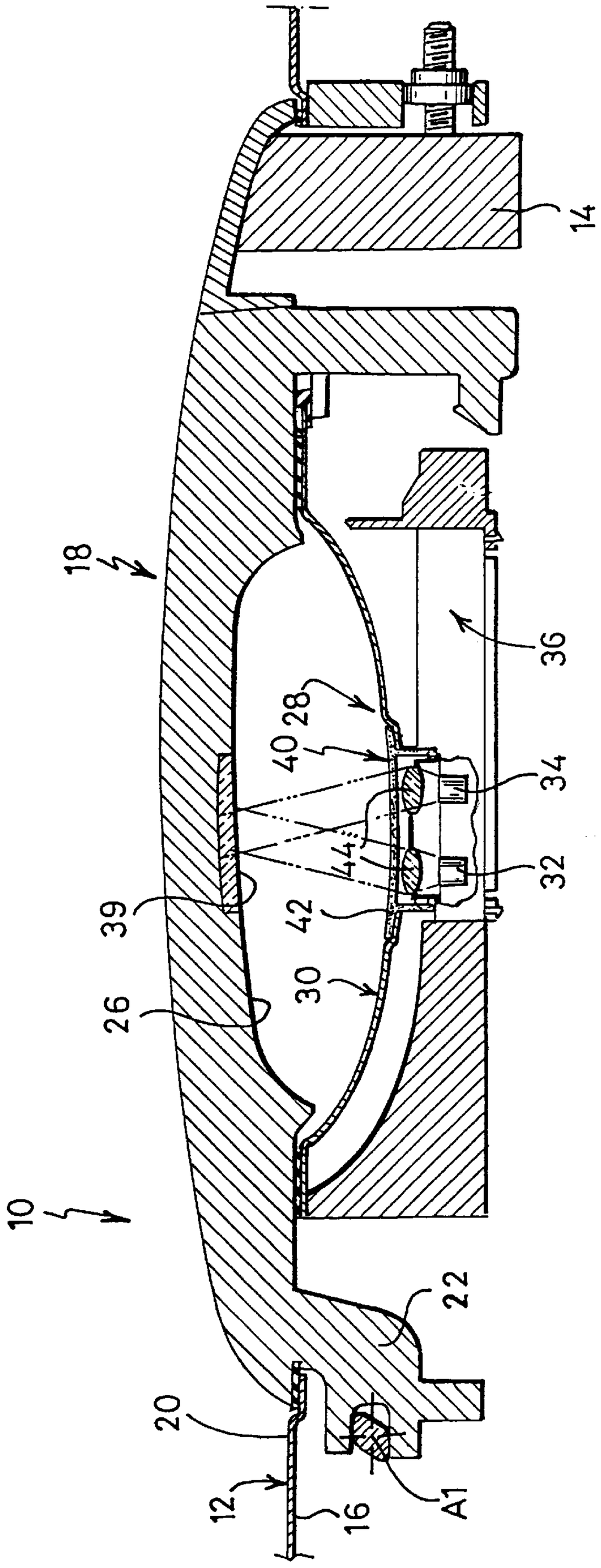


FIG.1

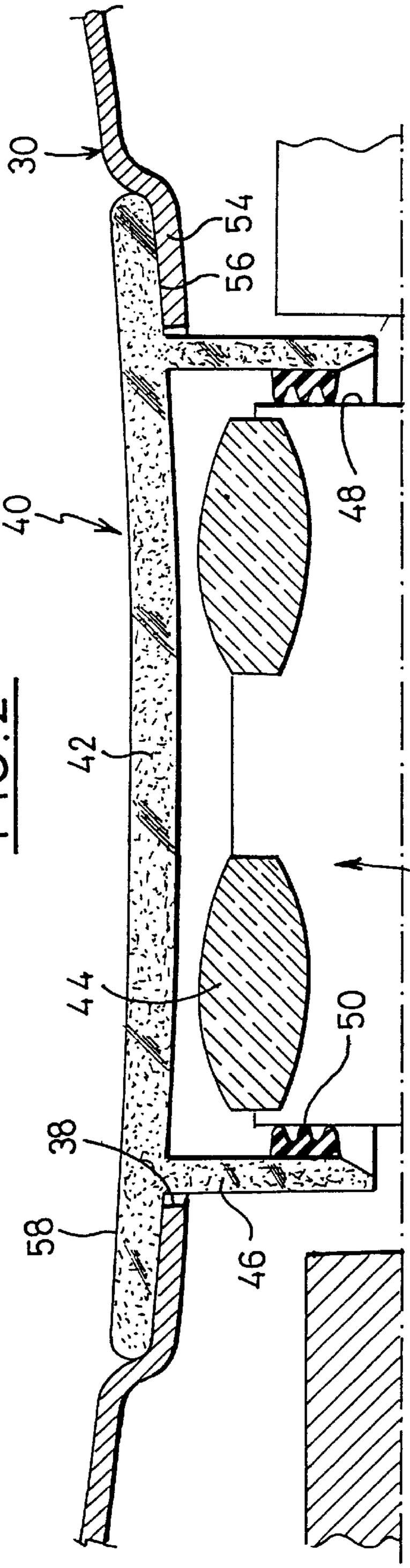


FIG. 2

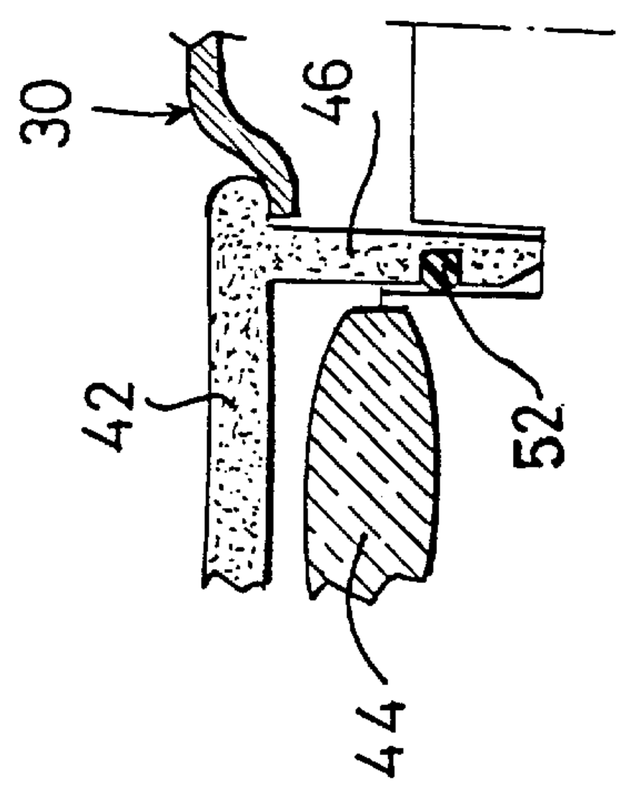


FIG. 3

SECURITY SYSTEM FOR A MOTOR VEHICLE OPENING LEAF COMPRISING A PROTECTIVE COVER

BACKGROUND OF THE INVENTION

The invention relates to a security system for a motor vehicle opening leaf.

The invention relates more specifically to a security system for an opening leaf of a motor vehicle of the type in which the opening leaf is held in the closed position by a lock which is operated by means of a handle arranged on the outside of a bodywork panel of the opening leaf, of the type in which the security system comprises means for detecting, remotely, by means of an electromagnetic signal, the presence of a user's hand near the handle, and of the type in which the detection means comprise a control circuit and at least one sensor capable of emitting or of receiving the electromagnetic signal.

Such a system is described, for example, in document FR-A-2,733,783. The system described in this document proposes the use, as a means of detecting the presence of the hand, of an infrared-radiation sensor. This sensor "observes" an area in space around the handle so that when a user's hand approaches it, the infrared radiation emitted by the hand is picked up and analyzed by the sensor which is then capable of transmitting control information to an antitheft unit.

However, the invention can also be implemented in the context of a security system in which the detection means comprise an emitter which emits an electromagnetic signal intended to be received by a receiver, the path of the signal between the emitter and the receiver running, at least in part, on the outside of an external panel of the opening leaf. In this case, the presence of the hand is detected when the hand intercepts the path of the signal because, at that instant, the signal is no longer received by the receiver.

In this case, the signal may, for example, be infrared radiation.

In such a system, it is therefore necessary for the sensor or sensors to be able to "see" the environment on the outside of the handle. However, there is good cause to ensure that the detection means control circuit should itself be arranged on the inside of the bodywork panel of the opening leaf, for obvious esthetic reasons.

BRIEF SUMMARY OF THE INVENTION

The object of the invention is therefore to propose a new design of such a system which simultaneously allows for good integration into the overall style of the vehicle, and makes the system easier to mount, allowing the cost of performing this operation to be reduced, while at the same time guaranteeing that the mounting and the system are reliable, particularly by achieving a good seal to prevent dust or moisture from being able to disrupt the operation of the system.

To this end, the invention proposes a security system for an opening leaf of a motor vehicle of the type in which the opening leaf is held in the closed position by a lock which is operated by means of a handle arranged on the outside of a bodywork panel of the opening leaf, of the type in which the security system comprises means for detecting, remotely, by means of an electromagnetic signal, the presence of a user's hand near the handle, and of the type in which the detection means comprise a control circuit and at least one sensor capable of emitting or of receiving the electromagnetic signal wherein the hand-detection means comprise an internal module which bears the sensor and which is arranged on the inside of the bodywork panel in such a way that the sensor is opposite an opening made in the bodywork panel, and the opening in the bodywork panel is blanked off by a cover which is made of a material that is transparent to the electromagnetic signal, the cover being secured against an external face of the bodywork panel.

According to other features of the invention:

- the cover comprises an external transverse wall which bears against the external face of the bodywork panel, and a tubular skirt which extends transversely inward from the external transverse wall through the opening in the bodywork panel and which cooperates in a sealed fashion with a casing of the internal module;
- the tubular skirt extends around a lateral external wall of the casing, and a seal is inserted between the skirt and the lateral external wall of the casing;
- the seal is borne by the skirt of the cover;
- the seal is borne by the casing of the internal module;
- the cover is secured to the bodywork panel;
- the cover is fixed to the bodywork panel by elastic push-fitting means;
- the cover is fixed to the bodywork panel by adhesive bonding.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the invention will emerge from reading the detailed description which follows, for an understanding of which reference will be made to the appended drawings, in which:

FIG. **1** is a diagrammatic view in section on a horizontal plane of a motor vehicle handle comprising a security system in accordance with the teachings of the invention;

FIG. **2** is a diagrammatic view illustrating, in an enlargement, the cover which blanks off the opening in the bodywork panel; and

FIG. **3** is a detailed view illustrating an alternative form of the means of sealing between the cover and the casing of the internal module.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** illustrates a handle **10** for a motor vehicle opening leaf.

The handle **10** is intended to be mounted on an external bodywork panel **12** of the opening leaf. It essentially comprises a handle support **14** which is fixed on an inside face **16** of the panel **12**, and a lever **18** for grasping, which is arranged on the outside face **20** of the panel **12**, but which is articulated to the support **14** about an axis **A1** substantially parallel to a general plane of the panel **12**. The direction of the axis **A1** will arbitrarily be termed vertical while the direction perpendicular to the axis **A1**, and also parallel to the general plane of the panel **12**, will be said to be longitudinal.

Thus, the lever **18**, which runs longitudinally, comprises, at a longitudinal front end, an articulation tab **22** which extends toward the inside of the panel **12** through an opening made therein and which is mounted so that it can pivot on the support **14**. The lever **18** can therefore be brought from a position of rest, illustrated in FIG. **1**, into an opening position (not depicted) in which its longitudinal rear end is moved away from the panel **12** transversely outward and in which the lever **18** actuates a transmission mechanism (not

depicted) allowing, for example, a lock which holds the opening leaf in the closed position to be triggered.

To bring the lever **18** into its opening position, the user of the vehicle has to insert his or her hand between the bodywork panel **12** and a surface **26** for grasping of the lever **18** so that this lever can be pulled toward him or her, outward with respect to the panel **12**.

For this to be possible there is, between the panel **12** and the lever **18**, a space **28** which, in a plane perpendicular to the axis A1, is transversely delimited by an inward depression **30** in the panel **12** and by a surface **26** for grasping of the lever **18**, which face one another.

In accordance with the teachings of the invention, the handle **10** according to the invention comprises detection means which allow the presence of the user's hand in the space **28** to be detected before this hand has actually grasped the lever **18** via its surface **26** for grasping, and which are borne by the handle support **14** arranged on the inside face **16** of the panel **12**.

More specifically, the detection means comprise, in particular, an emitter **32** and a receiver **34** which are borne by an internal module **36** itself fixed to the handle support **14**. The emitter **32** and the receiver **34** are both connected to an electronic control module (not depicted) which is itself also borne by the internal module **36**.

According to the invention, the emitter **32** emits a signal of the electromagnetic type which is intended to be received by the receiver **34**. The signal is emitted in such a way as to follow a path which runs through the space **28** in such a way that when the user's hand enters this space **28**, it necessarily intercepts the path of the signal which means that the transmission of the signal between the emitter **32** and the receiver **34** is interrupted. As the receiver **34** no longer receives the signal, it deduces from this an information item relating to the presence of the hand in this space **28**.

The signal emitted by the emitter **32** and received by the receiver **34** is preferably a light signal in the visible range or in the infrared range.

As can be seen more specifically in FIG. **2**, the emitter **32** and the receiver **34** are arranged substantially side by side, parallel to one another, set back toward the inside with respect to the bodywork panel **12**.

In accordance with the teachings of the invention, the two sensors **32**, **34** are arranged facing an opening **38** (see FIG. **2**) which is cut in the depression **30** in the bodywork panel **12**. In the embodiment illustrated, they are arranged facing the same opening **38**.

The signal emitted by the emitter **32** is therefore directed outward through the opening **38** and there is a reflector **39** borne by the lever **18** of the handle which reflects the signal back toward the receiver **34**, again through the opening **38**.

The control module which analyzes the signal received by the receiver **34** is therefore capable of detecting an interruption in the signal and, as appropriate, of transmitting a corresponding item of information to a unit for controlling the security system.

According to the invention, the opening **38** is intended to be blanked off by a cover **40**, an external transverse wall **42** of which extends substantially parallel to the bodywork panel **12**, on the outside thereof.

Of course, the external transverse wall **42** of the cover **40** is made of a material which is transparent to the electromagnetic signal.

In the embodiment of FIG. **2**, it can be seen that the internal module **36** also bears, in front of each of the two sensors **32**, **34** a lens **44**, the purpose of which is to focus and/or deflect the electromagnetic signal emitted by the emitter **32** or received by the sensor **34**.

Of course, the two lenses **44** are arranged between the corresponding sensor and the cover **40**.

The cover **40** comprises a tubular skirt **46** which extends axially inward from the external transverse wall **42**, through the opening **38** in the depression **30** in the panel **12**. As can be seen in FIG. **2**, the internal axial end of the skirt **46** surrounds an external lateral wall **48** of a casing of the internal module **36**. The skirt **46**, around the entire periphery of its internal axial end, bears a seal which cooperates with the external face **48** of the casing in such a way that there is delimited, inside the skirt **46**, a closed housing protected from any dust or moisture. In this embodiment of the invention, the seal is a lip seal **50** which is borne by the skirt **46** and which presses against the external face **48** of the casing, which is of course of a complementary shape compared with the skirt **46**.

In the embodiment of FIG. **3**, it can be seen that the seal may also be produced in the form of an O-ring **52** housed in a groove formed in an internal face of the skirt **46**. It is also possible to envisage for the seal **50** to be borne by the internal module **36**.

In accordance with the teachings of the invention, the internal module **36**, which bears the sensors **32**, **34**, is intended to be mounted from the inside of the bodywork panel **12**, but, on the other hand, the cover **40** is intended to be mounted axially from the outside inward, by engaging the skirt **46** through the opening **38**.

Thus, the external transverse wall **42** of the cover **40**, which is of a larger size than the opening **38**, presses via a peripheral edge against the external face **20** of the bodywork panel **12**, more specifically against that part thereof which forms the surround of the opening **38**. Advantageously, around the opening **38**, the bodywork panel **12** has an indentation **54** toward the inside, so that the external transverse wall **42** of the cover **40**, which presses via an internal face **56** against the indentation **54**, has an external face **58** which is in the continuation of the external face **20** of the panel **18** in the region of the depression **30**.

The cover **40** will advantageously be fixed in place by means which cooperate with the bodywork panel **12**, which will make it possible simply and reliably to position the cover **40** very appropriately with respect to the panel **12**. This ensures that the security system is esthetically integrated into the external style of the vehicle.

Fixing may, for example, be by adhesive bonding, but it is also possible to envisage for the cover **40** to be fitted with elastic push-fit means (not depicted) capable of cooperating, for example, with the edge of the opening **38** in the panel **12**.

A particularly advantageous application of the invention consists in using the information about the presence of the hand to trigger, for example, a procedure of identifying the user whose hand is approaching. This procedure, controlled by the control unit and, for example, performed by a device involving transponders, may thus be performed before the user has even grasped hold of the handle lever **18**. If the user is an authorized user, the unit may then trigger an operation for unlocking the lock.

What is claimed is:

1. A security system for an opening leaf of a motor vehicle in which the opening leaf is held in the closed position by a lock which a user operates by means of a handle arranged on the outside of a bodywork panel of the opening leaf, the bodywork panel having an opening in an external face, the security system comprising:

means for detecting, remotely, by means of an electromagnetic signal, the presence of a user's hand near the handle, the means for detecting comprising

a control circuit,

at least one sensor capable of emitting or of receiving the electromagnetic signal,

an internal module containing the sensor, said internal module arranged on the inside of the bodywork panel in such a way that the sensor is opposite the opening in the bodywork panel; and

a cover blanking the opening in the bodywork panel, the cover made of a material that is transparent to the electromagnetic signal, the cover secured against the external face of the bodywork panel in a sealed fashion with said internal module and forming a substantially continuous plane with the external face of the bodywork panel.

2. A security system as claimed in claim **1**, the internal module having a casing, wherein the cover comprises

an external wall which bears against the external face of the bodywork panel, and

a tubular skirt which extends transversely inward from the external wall through the opening in the bodywork panel and cooperates in a sealed fashion with the casing of the internal module.

3. A security system as claimed in claim **2**, the casing having a lateral external wall, wherein the tubular skirt extends around the lateral external wall of the casing, and further including a seal inserted between the tubular skirt and the lateral external wall of the casing.

4. A security system as claimed in claim **3**, wherein the seal is borne by the tubular skirt of the cover.

5. A security system as claimed in claim **3**, wherein the seal is borne by the casing of the internal module.

6. A security system as claim in claim **1**, wherein the cover is secured to the bodywork panel.

7. A security system as claimed in claim **6**, further including an elastic push-fitting means, wherein the cover is fixed to the bodywork panel by the elastic push-fitting means.

8. A security system as claimed in claim **6**, wherein the cover is fixed to the bodywork panel by adhesive bonding.

9. A vehicle comprising the security system of claim **1**.

10. A security system for an opening leaf of a motor vehicle, said opening leaf having a bodywork panel with an opening in an external face and defining an interior, said opening leaf held in a closed position by a lock which a user may operate by means of a handle arranged on said bodywork panel, said security system remotely detecting a user's presence proximate said handle via of an electromagnetic signal, said security system comprising:

a cover blanking said opening in said external face, said cover composed at least partially of a material transparent to said electromagnetic signal, said cover secured against and forming a substantially continuous plane with said external face;

a control circuit; and

an internal module including a first sensor capable of emitting said electromagnetic signal and a second sensor capable of receiving said electromagnetic signal, said internal module in communication with said control circuit, said internal module arranged on the interior of said bodywork panel such that said first sensor and said second sensor are disposed opposite said opening in said external face, said internal module cooperating in a sealed fashion with said cover.

11. The security system as claimed in claim **10** wherein said internal module has a casing, said cover further comprising:

an external wall which bears against said external face of said bodywork panel, and

a tubular skirt extending transverse said external wall through said opening in said external face, said tubular skirt forming a seal with said casing.

12. The security system as claimed in claim **11**, wherein said casing has a lateral external wall and wherein said tubular skirt extends around said lateral external wall, said security system further comprising

a seal interposed between said lateral external wall and said tubular skirt.

13. The security system as claimed in claim **12** wherein said seal is borne by one of said casing or said tubular skirt.

14. The security system as claim in claim **10** wherein said cover is secured to said external face of said bodywork panel.

15. The security system as claimed in claim **10** further including an elastic push-fitting, said elastic push-fitting securing said cover to said bodywork panel.

16. The security system as claimed in claim **10** wherein said cover is bonded to said bodywork panel.

17. A vehicle comprising the security system of claim **10**.

18. A security system for an opening leaf of a motor vehicle, said opening leaf having a bodywork panel with an opening in an external face and defining an interior, said opening leaf held in a closed position by a lock which a user may operate by means of a handle arranged on said bodywork panel, said security system comprising:

a cover blanking said opening in said external face, said cover composed at least partially of a material transparent to electromagnetic signals and comprising:

an external wall which bears against said external face, and

a tubular skirt which extends transversely inward from the external wall through the opening in the bodywork panel and cooperates in a sealed fashion with the casing of the internal module;

an internal module having a lateral external wall around which said tubular skirt of said cover extends and containing a detector that senses the user's presence of proximate said handle, said detector comprising:

a control circuit,

at least one sensor capable of emitting an electromagnetic signal, and

at least one sensor capable of receiving said electromagnetic signal, said sensors arranged on said inside and opposite said opening, said sensors in communication with said control circuit; and

a seal inserted between said tubular skirt of said cover and said lateral external wall of said internal module.

19. The security system of claim **18** wherein the seal is borne by said tubular skirt of said cover or said casing of said internal module.

20. The security system of claim **18** wherein said cover is secured to said bodywork panel by one selected from the group consisting of an elastic push-fitting and bonding material.

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